

The Lawrence Berkeley National Laboratory ES&H Self-Assessment Program

Lawrence Berkeley National Laboratory (Berkeley Lab) is a multiprogram national research facility operated by the University of California for the U.S. Department of Energy (DOE). DOE environment, safety, and health (ES&H) policy requires that all Berkeley Lab work be performed safely, with minimal adverse impact on the public and the environment. To facilitate safe and responsible work, Berkeley Lab divisions, directorates, and select departments must develop and implement Integrated Safety Management (ISM) plans. Berkeley Lab operates a formal internal ES&H self-assessment process to evaluate ES&H programs and policies and assure that ISM is implemented at all levels of activities and operations. ISM requires that:

- (1) work is defined,
- (2) hazards are identified,
- (3) controls are developed and implemented,
- (4) work is performed as authorized, and
- (5) feedback and improvement are continuous.

These five ISM core functions are sustained by applying the seven guiding principles of ISM. These are:

- (1) line management responsibility and accountability for ES&H,
- (2) clear ES&H roles and responsibilities,
- (3) competency commensurate with responsibilities,

- (4) an ongoing balance between safety on the one hand and research and operational priorities on the other,
- (5) identification of standards and requirements,
- (6) hazard controls tailored to the work, and
- (7) operations authorization.

Self-assessment at Berkeley Lab is a continuous process of information gathering and evaluation. The goals of the self-assessment program are:

- Ensure that work activities and operations are done safely and in a manner that maximizes public and environmental protection.
- Ensure that the five core functions and seven guiding principles of integrated safety management are employed effectively in work planning and performance.
- Meet regulatory requirements for DOE oversight, self-assessment, and an integrated safety management system.
- Meet contractual requirements for ES&H performance and self-assessment.

(Berkeley Lab operates under DOE/University of California Contract DE-AC03-7600098, Appendix F.)

The objectives for conducting self-assessments are to:

- Provide a mechanism that enables divisions and support organizations to compare their safety performance to ISM-based performance objectives and benchmarks.
- Ensure timely identification and correction of ES&H deficiencies.

- Provide a documented basis for lessons learned.
- Identify and foster safety programs and systems that enhance safe work activities and operations.

The Laboratory Director establishes the self-assessment program and directs division directors to implement the program. The division directors are responsible for providing resources to ensure that the self-assessment program is implemented effectively within each division.

The self-assessment program at Berkeley Lab comprises four distinct assessments: the Division Self-Assessment, the Integrated Functional Appraisal (IFA), the Management of ES&H (MESH) review, and the Appendix F Self-Assessment. The four forms of self-assessment are summarized in Table 1 and described in the narrative that follows.

The five core functions and seven guiding principles of ISM are integrated into the performance objectives and criteria for each type of assessment. The performance measures are clearly defined, consistent with management expectations, and based on applicable industry standards and regulatory and contractual requirements.

The **Division Self-Assessment** uses the five core functions and seven guiding principles of ISM as the basis of evaluation. The appraisal focuses on workplace safety by emphasizing line-management responsibility for safe work practices, authorization of work, and feedback and improvement. Performance indicators are developed by consensus with Berkeley Lab's Office of Assessment and Assurance (OAA), division safety coordinators (one representing each division), and the Berkeley Lab Environment,

Health and Safety (EH&S) Division program managers. These indicators (or metrics) assess division performance of each ISM core function. For example, a metric that measures workspace inspections indicates the efficacy of each division's "identifying hazards" (the second ISM core function). Metrics also promote compliance with applicable regulatory requirements. For example, one metric in the "perform work" category (the fourth ISM core function) measures whether each division stores its hazardous and radioactive waste in a manner that complies with all applicable regulations.

The division directors designate their respective division self-assessment teams to perform this review annually. Safety coordinators manage this process for their respective divisions, with most activities performed by division line management.

The **Integrated Functional Appraisal** is an in-depth ES&H technical review of division work activities and operations. The IFA focuses on higher-hazard work, particularly work requiring formal authorizations. At Berkeley Lab, formal authorizations require approval of both the EH&S Division Director (or designee) and the division director of the division in which the work will be performed. The assessment concentrates on adequacy of authorizations, effective control of hazards, balance of operation and safety priorities, and applicability of institutional standards and regulatory requirements. In assessing work under formal authorizations, the appraisal determines if the division is following existing authorizations, and if all division work is properly authorized.

Another function of the IFA is to update the Hazards, Equipment, Authorizations, and Review (HEAR) database, a Labwide inventory of all existing workspace and operational hazards.

The IFA is conducted by EH&S Division technical experts, who inspect all division workspaces that include high- and medium-level hazards. The IFA team also inspects a representative sample of lower-hazard workspaces. Each division receives an IFA once every three years.

The **Management of ES&H** review evaluates division management of environment, safety, and health in its research and operations, focusing on implementation and effectiveness of the division's ISM plan. This review includes interviews with a vertical cross section of a division's employees to assess safety culture, senior and line management support for safety, and robustness of ES&H communications. The MESH review also includes inspections of a representative sample of staff workspaces.

As a peer review, the MESH review is performed by members of Berkeley Lab's Safety Review Committee (SRC), with staff support from OAA. Each research and operation division at Berkeley Lab is represented on the SRC. Each division receives a MESH review every two to four years, depending on the results of the previous review (two years for underperforming divisions, up to four years for outstanding divisions).

Information obtained from the Division Self-Assessment, IFAs, and MESH reviews addresses performance requirements in the DOE/ University of California (UC) Contract **Appendix F Self-Assessment**. This assessment is the Department of Energy's primary mechanism for evaluating the Laboratory's contract performance for ISM. Appendix F contains performance objectives, criteria, and measurements (POCMs) that are closely aligned with the division self-assessment performance criteria and, therefore, are based on the core functions and guiding principles of ISM. In recent years, the Appendix F

POCMs have also included milestones for selecting, implementing, and maintaining certified systems in various ES&H disciplines. Additional information required for Appendix F is provided by EH&S Division functional managers. The Appendix F Report is prepared quarterly, with an annual report submitted at the close of the fiscal year.

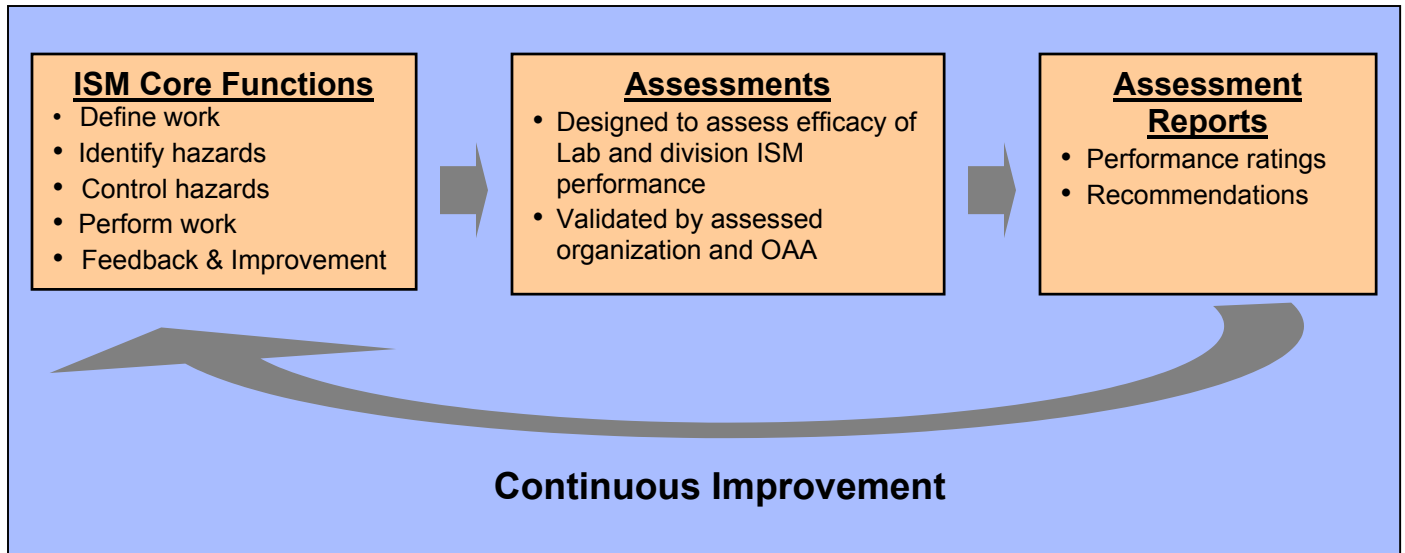


Figure 1. Annual self-assessment cycle at Berkeley Lab.

As shown in Figure 1, the annual self-assessment cycle promotes continuous improvement through all four appraisals. The Division Self-Assessment performance criteria are revised annually, based on the experiences of the previous self-assessment year. As the hazards of Berkeley Lab change and division ES&H programs mature, new metrics are instituted and old metrics are eliminated. For example, in recognition that ergonomic conditions are a significant hazard, a performance criterion for an active ergonomics program has been incorporated into the performance metrics in recent years. Correspondingly, the Appendix F Self-Assessment POCMs are also updated annually.

The ISM performance criterion has evolved from a single expectation of ISM implementation and effectiveness to several metrics indicative of Berkeley Lab's performance in each core function, which provides DOE with a more comprehensive validation. The procedures for conducting an IFA were recently revised to ensure a consistent appraisal protocol and a more systematic review process. Finally, a recent improvement to the MESH review process is the requirement that each division, following their MESH review, demonstrate the effectiveness of their ISM programs to senior Berkeley Lab management.

Personnel conducting each of the distinct self-assessments are knowledgeable, experienced, and competent. The self-assessments assure diverse perspectives and a consistent standard of quality by trained personnel. All forms of self-assessment include members who are not part of the assessed organizations. External parties participating in self-assessments lend credibility and provide an additional perspective to promote continuous improvement.

All forms of Berkeley Lab's self-assessment are validated for accuracy by the assessed organization and OAA. Annually, a Berkeley Lab ES&H Self-Assessment Report is prepared that includes the results of all Division Self-Assessments, IFAs, and MESH reviews. This comprehensive report analyzes all self-assessment activities performed during the past year and identifies noteworthy practices and opportunities for improvement for the Laboratory and each division. In 2003, the Labwide opportunities for improvement involved laser safety, formal work authorizations, and division accident and injury reduction programs. The report is distributed to senior Laboratory and division management, division safety coordinators, and EH&S Division program leads.

The EH&S Division Director communicates results directly to the Berkeley Lab director and all division directors at a meeting of senior Berkeley Lab management.

Each division tracks resolution of opportunities for improvement identified in the annual report in the Laboratory Corrective Action Tracking System (LCATS). LCATS is a Web-based database designed to record safety deficiencies and corresponding corrective actions. Division line management prioritizes the results of self-assessments to address programmatic deficiencies, and divisions are expected to resolve all deficiencies in the following self-assessment year. OAA tracks implementation of opportunities for improvement, and reports progress annually.

Each division also uses LCATS to track workspace safety deficiencies (e.g., electrical hazards, improper chemical storage, outdated signage, etc.) discovered during the self-assessments. These findings are more specific than the programmatic deficiencies identified in the annual report, and generally are resolved within a month of their discovery.

How has the process worked? Over the past several years Berkeley Lab's ES&H performance has improved significantly. Figure 2 illustrates the annual DOE and UC performance ratings for ES&H at Berkeley Lab. The figure charts the steady improvement in ES&H performance since self-assessment was initiated in 1992.

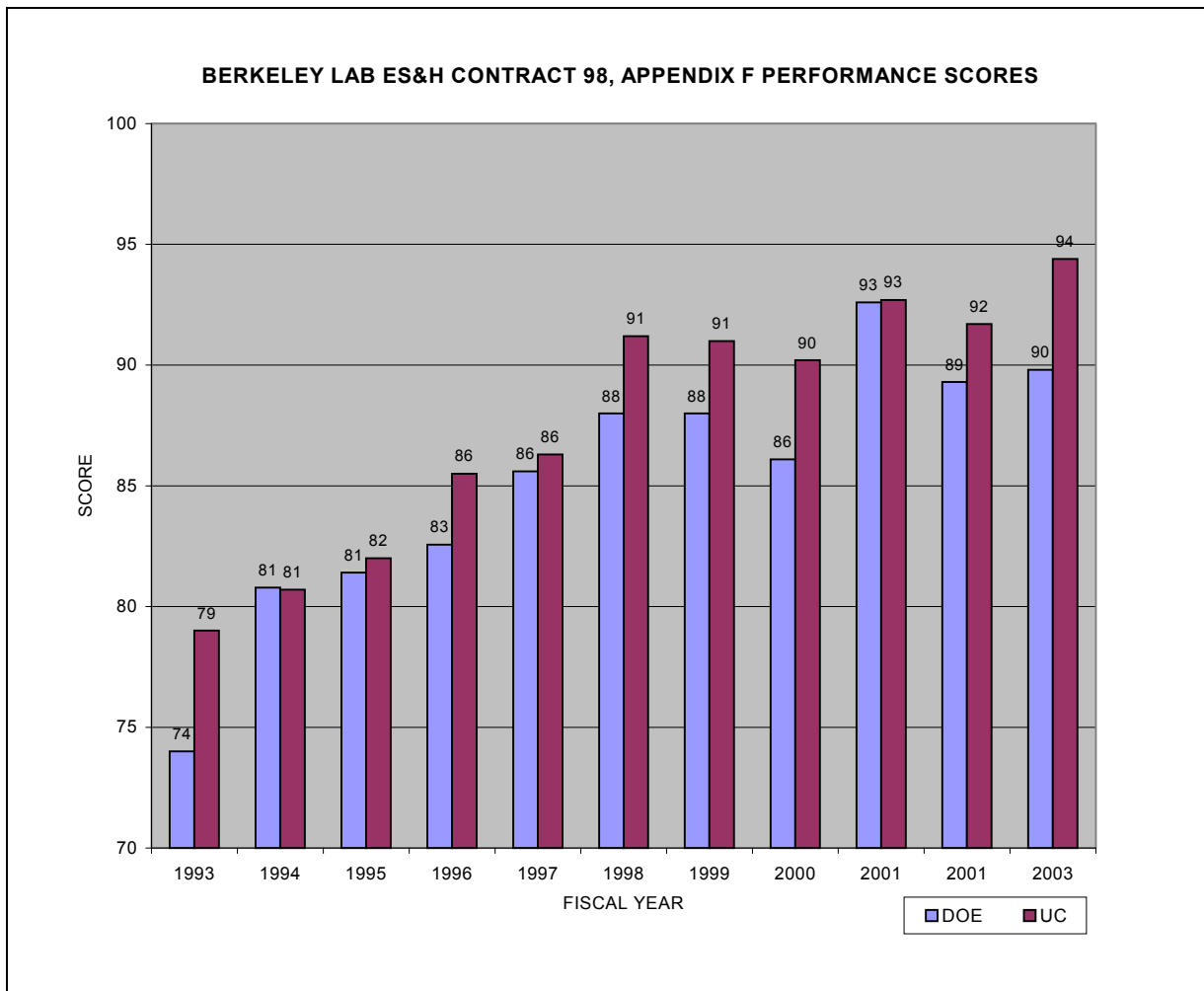


Figure 2. Annual ES&H Performance scores at Berkeley Lab, as determined by DOE and UC.

The LBNL ES&H Self-Assessment Program has received official certification from the Department of Energy for fulfilling the requirements of a model self-assessment program and is recognized by the Energy Facility Contractors Group (EFCOG) as a best practice. More information about the LBNL ES&H Self-Assessment Program is available on the web at <http://www.lbl.gov/ehs/oa/>. You can also contact John Chernowski at (510) 486-7457 or jgchernowski@lbl.gov.

Table 1.Four Appraisals of LBNL Self-Assessment

Assessment	Review Type	Performed By
Division Self-Assessment	Workplace Safety	Line Management
Safety Review Committee MESH (Management of ES&H)	Safety Management	Peer Researchers & Staff
Integrated Functional Appraisal	In Depth Technical	EH&S Division Personnel
Appendix F Self-Assessment (Contract Performance Measures)	DOE/ UC Contract	Functional Managers